



FPU OPERATIO



FISCHER-PORTER UPGRADE (FPU)
OPERATIONS MANUAL
FOR THE
WFO NWSREP
September 7, 2005

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service - Cooperative Weather Observer Program
Observing Services Division - W/OS7



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CHAPTER 1 – IMPLEMENTATION ACTIONS

1.1 RESPONSIBILITIES

1.1.1 NWS Headquarters:

The Fischer-Porter Upgrade (FPU) is a modification to existing Fischer & Porter (F&P) gauges and the project is mapped according to a detailed plan, known as the ***FPU Operational Implementation Plan***. To read the plan, access our NWS Surface Program webpage on: <http://www.nws.noaa.gov/ops2/Surface/coopimplementation.htm> and near the end of the listed documents, click on: COOP FPU Implementation Plan Text, April 28, 2005.

The NWSREP assembles the FPU in his WFO and then installs it at the COOP site. An installation instruction handbook, ***FPU Assembly Procedural*** (formerly, *FPU Beta Site Installation Procedural*), on: <http://www.nws.noaa.gov/ops2/Surface/coopimplementation.htm>, it is near the end of the listed documents. Click on, FPU Assembly Procedural, June 2005.

The FPU Kit will come delivered to your WFO with the, ***FPU Technical Manual*** (v 3.2), on CD-ROM. However, a revised version of the contractor's technical manual is posted to the web <http://www.nws.noaa.gov/ops2/Surface/coopimplementation.htm>. Search to the near the end of the listed documents and click on, Fischer-Porter Upgrade Technical Manual v2.2. (Dec 4, 2003).

Note: The gauge sensor calibration instruction in the delivered CD-ROM is out of date.

The NWS Office of Operational Systems (OPS22) works with a contractor to display COOP Sites and ASOS Sites on regional and semi-regional maps. Approximately 2,500 F&P sites are displayed on ten maps and those sites designated for FPU modification are indicated by a bullseye circle about the point. These maps will be updated monthly to give implementation status of each FPU site. Maps are viewable on: <http://www.nws.noaa.gov/ops2/Surface/coopmaps.htm>

1.1.2 Regional Headquarters:

Your Regional Cooperative Program Manager (RCPM) coordinates with OPS22 to identify candidate COOP Stations to receive the FPU modification. Changes to the designated site list are authorized by OPS22. The OS7 coordinates changes with the RCPM for the selection of sites to participate in the Fischer & Porter Data Intercomparison Study.

Your RCPM coordinates with WFOs with the greatest number of designated sites, to minimize storage and scheduling difficulties at the WFO.

The RCPM participates in bi-weekly or monthly conference calls with OPS22 to learn of engineering, procedural, and schedule issues that affect the rate of deployment. Peak rate of deployment will not exceed 10-15 FPU Kits per week, or approximately 4 units per Region per week.

1.1.3 Field Offices:

1. Once per week, inform your RCPM via e-mail, of your planned installation schedule and provide a status update on the systems installed. Coordinate with RCPM to determine the

2. Coordinate with Cooperative Observer to schedule dates for the FPU mounting-post work, FPU installation work, and FPU operations tutorial. Update your Observer on your planned schedule, at least 14 days in advance. Explain to your Observer how the FPU is relatively easy to operate and how your hands-on tutorial should take just 30 minutes. If practical, mail your Observer a printed copy of the *FPU Observer Instruction* booklet, two weeks in advance of your visit, so s/he understands the concept of operations.
3. Receive FPU Kit, disassemble F&P gauge, assemble FPU gauge in your field office.

Each FPU Kit will arrive at your WFO in four cardboard boxes.

- a. FPU Upgrade Kit (3 boxes, one each for Steel Enclosure Cabinet, Solar Panel, and the 12V Battery)
- b. FPU Auxiliary Install Parts Kit (1 small box with updated U-bolts and Hangers)

The packing list from NLSC (graphic, below) identifies a third requisition item, the Data Key Reader. This Reader is used by the WFO only and not at the COOP Observer's site. Hence, it is issued only once to the WFO and for convenience it is bundled with the first FPU Kit delivered in the initial requisition order.

ORDERING ORGANIZATION: W60130 BILL TO ORG CODE: W60790		AS OF: 27-APR-05 08:31:44										
CONSIGNEE: WEATHER SERVICE OFFICE, SPRINGFIELD REGIONAL AIRPORT 5805 WEST HIGHWAY 22 *INSIDE DELIVERY REQUIRED** SPRINGFIELD MO 65802-8400 USA POINT OF CONTACT: STEVE BERRY		REQ# NO: WR9440511700104 (417) 864-2535 ATTN: PAUL MURPHY // YFU										
		SHIP SEQ NBR 621460 SHIP TO ORG WR9440										
REQUISITION TYPE: INT SPECIAL INSTRUCTIONS: ENSURE THAT THE DILIC-KIT SHIPS W/ SOLAR PANEL (-J) & BATTERY (-2B1)												
LOCATION(S)	ITEM NBR	NAT'L STOCK NUMBER AGENCY STOCK NUMBER	REQUISITION NBR DESCRIPTION	SERIAL NUMBER FAILURE REPORT	ORD	ISS	REQ	I/U	ISS	QTY	UNIT PRICE	TOTAL VALUE
A11-01/22ABC	1	NWSD-22-950-0002 DILIC-KIT	WR9440511700104 UPGRADE KIT		1	1	0	EA	1	1	\$0.00	\$0.00
Repair Return item, but is NOT accountable property ITEM 1												
COMMENT: PER W/OS7 - QUESTIONS OR CONCERNS SHOULD BE DIRECTED TO 301-713-0722 X-194												
C22-33B/C	2	NWSD-31-270-0002 DILIC-KIT-1A	WR9440511700104 FPU AUX INSTALL PARTS KIT		1	1	0	EA	1	1	\$0.00	\$0.00
ITEM 2												
COMMENT: FPU DOCUMENTATION FOUND @ HYPER://WWW.NWS.NOAA.GOV/OPS2/SURFACE/DOCUMENTS/												
C30-06BC	3	7025-01-501-7493 DILIC-6	WR9440511700104 DATA KEY READER		1	1	0	EA	1	1	\$0.00	\$0.00
ITEM 3												
COMMENT: CNK (1) DILIC-6 REQUIRED PER WFO - ISSUE PER W/OS7 22APR2005 @ 14:06												
SU - 00270												
Picked By: _____			Pick Date: _____			Packed By: _____			Pack Date: _____			
Inspected By: _____			Inspect Date: _____									
 REGN WR9440511700104			 BILL ORG W60790			 TASK C8MSJGEPUA						

PAGE:002 R=96%

ID)

TEL 316364471769

JUN-07-2005 09:41PM

Note: Inside the FPU Kit's largest box will be the manufacturer's parts packing slip (graphic, right).

Realize that none of the FPU Kits are packaged with a Thermistor Cable, the fifth item on this packing slip.

The handwritten word, '*Removed*' (see graphic, right) was written by the manufacturer and applies to all FPU Kits being delivered.

The manufacturer kept this part listed just to comply with a government contract obligation made years prior to the deployment decision.

ORDER TO: US DEPT OF COMMERCE/NOAA P/O # 50DGNW190100-L001 SALES ORDER 3105		
Coastal Environmental Systems		
Qty.	Description	
✓	1 Package 1 - LOAD CELL ASSY. - Load Cell Assembly - Load Cell Plunger and Mounting Hardware	
✓	1 Package 2 - ENCLOSURE MOUNTING HARDWARE - Enclosure Mounting Hardware	
✓	1 Package 3 - MISC. HARDWARE and MANUALS - CD, Technical Manuals. Zeno and Enclosure - Cable, Battery, 6003124007 - Datakeys (2)	
✓	1 Load Cell Cable, 6003124004	
✓	1 Thermistor Cable, 6003124003 <i>Removed</i>	
✓	1 Certificate of Conformance	
Checked/Packed by: <u>QVOC</u>		
Date: <u>2/18/03</u>		

4. Perform the Equipment Installation at the Cooperative Observer site.
5. MIC signs the Installation and Check-Out Form (Appendix X) INCO gives NWSREP name and date of installation and start of operations of the FPU data logging.
6. NWSREP will issue a single Public Information Statement (PNS) within 5 days after each FPU data logger is powered-on as an operational system. [Instructions are given in NWSI 10-1805, change in data assimilation method.]

1.3.4. Records Retention Policy for FPU:

The following FPU data records and FPU data media shall be kept on hand at the WFO:

- a. HPD monthly files (e.g., 41008778_20050415_1010459_...4414.csv) for at least 12 months on the network workstation.
- b. Any *FPU Event Log Worksheet*, or any *FPU Trouble Report*, keep an electronic copy (i.e., optical scan of printed form) at WFO for 12 months.
- c. The *30-Day Evaluation Report* and the *Operational Implementation Checklist – Part B* – keep at WFO for 6 months.
- d. One spare Data Key at WFO if you serve fewer than ten FPU Observers. Three spare Data Keys at WFO if you serve more than ten FPU Observers. **Note:** You may order a spare Data Key from NLSC - it has a separate ASN part number.

Maintain a bookmark on: <http://www.nws.noaa.gov/ops2/Surface/coopimplementation.htm> for ready access to FPU manuals and FPU policy directives issued by NWS headquarters.

1.2. FPU NETWORK REQUIREMENTS

1.2.1 Precipitation Gauge Type:

The recording precipitation gauge is required to be a Fischer-Porter/Belfort punch tape model, designated by the acronym F&P Modification 6, Model 3. There are approximately 2,500 of these gauges sited in the CONUS, Alaska, Hawaii, Guam, Puerto Rico, and the Virgin Islands.

You may not request an FPU modification for any F&P that operates with the following:

- a. Data Telemetry Device
- b. Stream Level or Lake Level Gauge
- c. Extreme Cold Climate Exposure
- d. High Latitude – Low Solar Exposure

1.2.2 Precipitation Data Transfer

- a. The COOP Observer may not e-mail FPU precipitation data files to your WFO
- b. Instruct the COOP Observer to use the portable electronic medium (data key) to transfer his data to you each month, via United States Postal Service (USPS) mail
- c. Establish strict logistics management of the ‘data key’ through use of a Data Key Log Sheet posted in your WFO.

Note: For each FPU gauge there will be just one data key issued to the Observer (no spare) and just one Data key issued to the WFO (no spare). So then, for a WFO with fifteen FPU gauges, the NLSC will initial issue a total of thirty (30) data keys to this WFO.

1.2.3 Precipitation Data - Electronic Records Collection

Electronic data collection of the Observer’s Data Keys first involves a stand-alone personal computer (PC) or laptop PC computer, one with absolutely no electromagnetic means of communication with any NWS-network workstation within the WFO. The stand-alone PC/laptop shall not in any way directly communicate with any Government furnished workstation or terminal that is capable and used as a link to the NWS-network enterprise (i.e., AWIPS). The stand-alone/laptop serves each month to virus scan and otherwise isolate the COOP Observer’s data key files from NOAA/NWS enterprise network systems. This stand-alone/laptop has another function not easily accomplished on a NOAA/NWS enterprise workstation, this is to host obsolescent operating system software. The data key reader for our FPU system relies on a graphical user interface (GUI) developed by the same vendor, Coastal Environmental Systems, Inc. (CES), and their GUI runs only on Windows 95/98/ME operating systems. The Windows 95/98/ME operating systems are not available on the NWS-network system terminals.

For this reason the stand-alone PC/laptop (from here on referred to as the ‘Coastal-PC’) that hosts the CES ‘PC Data Key Reader’ user interface, shall be configured non-integral with the NWS-network station. The Coastal-PC shall be free of data cables, data wires, infrared signal (wireless), radio, laser signal, or any other similar means of communication with the NWS enterprise systems.

As NWSREP you will ensure the Coastal-PC (stand-alone PC/Laptop) meets the following minimum requirements.

Hardware: Any microprocessor with the following:

- a. 3.5inch disk drive, 100MB of hard-disk storage volume
- b. CD-ROM for the install disk, otherwise you will have to copy CD-ROM files for the PC Key Reader program onto a 3.5 inch floppy disk to install to PC.
- c. 4MB RAM; 386MHz processor,
- d. One parallel port (i.e., a printer port) to connect Coastal's Key Reader device (the data key receptacle) to the Coastal-PC.

Operating System: The Coastal-PC shall be configured with any one of the three Windows operating systems. If your hardware can support the minimum system requirements as described by Microsoft (<http://support.microsoft.com>) then you may install a clean, new, operating system.

Minimum Required:	Windows 95	Windows 98	Windows ME
Microprocessor	386DX 486 Recommended	486DX, 66MHz Pentium Recommended	Pentium 150MHz, or better
RAM Memory	4MB 8MB Recommended	16MB; 24MB Recommended	32MB, or better
Hard-Drive Volume	55MB for a full-system install, or 40MB to upgrade	295MB for a full-system install on FAT32, or 355MB for full- system install on FAT16	320 MB
External Disk Port	3.5 inch high-density	3.5 inch high density	CD-ROM / DVD-ROM
Pointing Device	None specified	None specified	Microsoft Mouse

Key Reader Utility: Coastal Environmental Systems, Inc (CES) 'PC Key Reader' Ver. __

File-directory structure: All folder names should be identical to that described in Section 2.2.5, for the NWS-network workstation. For example C:\hpd\2005\month .

On or before the day you transmit the monthly precipitation data to NCDC, you will access the Coastal-PC sub-directory and copy each of CSV file onto a portable 3.5inch diskette. The diskette is then used to transfer these CSV files to the NWS-network workstation with an FTP utility, such as WsFTPL marketed by the Ipswich Corporation.

1.2.4. Filename and Storage Standard:

The NWSREP shall ensure the totality of data on each Coop Station=s Data Key is copied as a single file into the WFO workstation. **Note:** The FPU key data file shall not be renamed. The

file shall be saved to a dedicated permanent directory with a sub-directory structure that is organized by year and month (e.g., c:\hpd\2005\jun\) for at least 12 months.

Note: Ensure all monthly files in your PC directory remain unchanged from their automatically named format!

Example: coopidno_yyyymmdd_hhmmss_yyyymmdd_hhmmss.csv

41008778_20050415_101459_20050702_094414.csv
(Station ID__OldestDate__Time__YoungestDate__Time.CSV)

1.2.5 Precipitation Data Reporting to NCDC

The NCDC, Climate Data Division, Data Ingest and Processing Branch (E/CC11), instructs each WFO to use these software and network standards to prepare and transmit monthly FPU data:

- a. File compression (ZIP) software, AWINZIP32.EXE@
- b. File Transfer Protocol (FTP) executable file, AWSFTP95.EXE@
- c. NOAA/NWS Enterprise Network Connection (NOAA Compliant Terminal in WFO), only

1.2.6 Precipitation Data Quality Assurance NCDC

The NCDC quality controls your station's files to prepare the FPU data for publication so the FPU data appear in the same table, same quality control flags, and same units of measure as the F&P data. To meet ORE requirements in 2005 the NCDC posted some CSV files for NWS users' view on a limited access site: ftp://ftp.ncdc.noaa.gov/pub/data/hpd/fpu/csv_files/ . No decision has been made on whether to make all CSV files viewable on a limited access web site.

Note: NWS offices ordinarily do not see their FPU data until 3 months after the FPU data was transmitted from WFO. Then you are able to view data on-line in the periodicals: *Hourly Precipitation Data* and *Climatological Data*, on <http://occluded.ncdc.noaa.gov/SerialPublications>.

1.3. IMPLEMENTATION CHECKLIST TASKS:

Ensure that you have accessed the latest version of the NWS Operational Implementation Checklist – Part B. It is accessible on the NWS webpage:

<http://www.nws.noaa.gov/ops2/Surface/coopimplementation.htm>

Click on the document titled, 'COOP FPU Implementation Plan Appendix, April 28, 2005'.

The following Checklist - Part B, (see graphic, below) should appear.

Item #	Item Description	OPR	Completion Date
Cooperative Observer Program Planned Product Improvement OI Check List – Part B			
Planned Product Improvement: <u>Fischer-Porter Upgrade</u>			
Location (SID, Name, State): _____			
Office Completing this Check List: _____ Date: _____			
3.4 Pre-OI Operational Support Activities			
B.	Conduct Local operator/maintenance Training	WFO	
4.3 OI Installation Activities			
A.	Download files for archive	WFO	N/A
B.	Perform installation and checkout in accordance with MOD NOTE	WFO	
4.4 OI Monitoring and Coordination Activities			
A.	Installation Notification (i.e., transmit PNS)	WFO	
B1.	Begin routine maintenance monitoring and documentation	WFO	
B2.	Prepare and provide 30-day report as necessary	WFO	
B.3	Ensure data continuity for transition month. Decode final month of F&P data from B-18 (i.e., partial month) and enter hourly and daily totals to Form 791D. E-mail to Stu Hinson (NCDC)	WFO	
5.0 Post OI Activities			
A.	Operational Quality Control: Monitor ongoing meteorological performance	WFO	
B2.	Submit WS Form B-44 to NCDC	WFO	
B5	Enter data in CSSA	WFO	
C.	Dispose of old equipment in accordance with installation instructions.	WFO	

Appendix Page I-5
Operational Implementation Plan for Fischer Porter Sensor Upgrade – June 2005

1.3.1 Training the Observer in Basic FPU Operations and Maintenance

All training for authorized operators and maintenance personnel will be completed prior to operational implementation. Training materials are accessed from NWS Headquarters webpage; <http://www.nws.noaa.gov/ops2/Surface/coopimplementation.htm>, and through the NWSREP delivery of printed *FPU Observer Instructions Guide* to the COOP Observer, and eventually through NWSTC training sessions. No later than the day of operational implementation,

NWSREP trains and witnesses and validates (i.e., documents) that his Observer has been trained on the FPU. Field level maintenance training will be the responsibility of the National Weather Service Training Center (NWSTC) and offered through training courses and training modules. Primary instruction will be included within the annual course titled, COOP Network Operations. Supplementary distant learning modules will be developed by the NWSTC. The OS7 will provide the WFO the necessary training materials for instructing the COOP Observers in the use of the FPU equipment. The WFO will provide local observer training in operation and simple maintenance of the FPU equipment. The following materials will be provided to the WFO:

- a. NWSREP maintenance training materials will be provided in Contractor's Technical Manual, Version 2.2 (December 4, 2003).
- b. Observer training materials will be provided by OS7.

1.3.2 System Assembly, Installation, and Checkout

Installation and checkout of the FPU will be performed in accordance with the *FPU Assembly Procedural* (originally titled, '*Beta Site Procedural*') issued by OS7 and available on webpage: <http://www.nws.noaa.gov/ops2/Surface/coopimplementation.htm>. This is a two-step process. The first step is to prepare the site for installation. This involves pouring cement to support the stand alone pole for the data logger, battery, and solar panel. The time to complete this task is generally two hours or less, but the curing time for the cement is at least 24 hours before step two can occur. Step two will also take about 4 hours or less. Key activities include: (a) modify an F&P unit inside WFO to create one FPU unit, (b) configure and calibrate the FPU in WFO, (c) transport FPU to site, (d) remove the F&P from site, (e) replace the removed F&P with the FPU transported to site, (f) mount the data logger and solar panel to pole, (g) check calibration with five inch equivalent weight with data logger's display of 'Rain:' reading, and (h) witness the Observer download data to data key.

1.3.3 Public Information Statements (PNS)

Upon successful completion of FPU installation and checkout the NWSREP will update the CSSA Station Inspection Report Page, transmit a Public Information Statement (PNS) to announce the equipment modification, update the WS Form B-44 (CSSA Station Report) , and conduct a 30-day system and data evaluation.

The PNS shall be transmitted within 5 working days after successful installation and checkout. The NWSREP will prepare and issue a PNS for each FPU implemented location within the WFO's County Warning Area.

The NWSREP should be familiar with the NDS 10-1805, Section 2.1; Local or Regional Service and Technical Changes. Procedures for changing local or regional products are determined by the appropriate Regional Headquarters. The changes are announced via a local PNS transmitted by the appropriate offices, as specified in the following instructions:

- a. NWSI 10-501, WFO Statements, Summaries, Tables Products Specification
- b. NWSI 10-1701, Test Product Formats and Codes

The format and style of the PNS should be similar to those of the national service and technical change messages described in the NDS 10-1805.

In the day or two prior to transmitting the PNS, the NWSREP must complete the Installation Checkout form and validate that the FPU is logging data. The NWSREP accesses his PNS template, edits it for COOP station name, and enters the 'Implement Date' which is calendar day (e.g., May 18, 2005) when the FPU first began logging data operationally.

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PUBLIC INFORMATION STATEMENT
NATIONAL WEATHER SERVICE NASHVILLE TN
748 AM CDT THU MAY 19 2005

...FISCHER-PORTER UPGRADE (FPU) NOW IMPLEMENTED AT COOPERATIVE
STATION, CHEATHAM LOCK & DAM, TENNESSEE ON MAY 18, 2005

THE EQUIPMENT MODIFICATION WILL ONLY CHANGE THE WAY THE PRECIPITATION
MEASUREMENT IS TAKEN. THERE WILL BE NO CHANGE IN THE QUALITY OR THE
TIMELINESS OF THIS STATION'S HOURLY PRECIPITATION DATA (HPD). DATA
WILL BE REPORTED IN THE MONTHLY HPD PUBLICATIONS ONLY.

THERE AREA A TOTAL OF 13 COOPERATIVE STATIONS IN THE WFO NASHVILLE
COUNTY WARNING AREA (CWA) THAT WILL BE UPGRADED. THESE STATIONS
WILL BE UPGRADED ON THE DATES INDICATED BELOW.

COOP STATION NAME.....COOP STN ID...IMPLEMENT DATE...DATA AVAIL DATE
OLD HICKORY WFO, TN      40-6806      MAY      2005     JUNE      2005
LIVINGSTON WLIV, TN     40-5332      MAY      2005     JUNE      2005
PORTLAND, TN            40-7359      MAY      2005     JUNE      2005
CHEATHAM LOCK & DAM, TN  40-1663      MAY      2005     JUNE      2005
CELINA, TN              40-1561      JUNE     2005     AUGUST    2005
LEBANON, TN             40-5108      JULY     2005     SEPTEMBER 2005
CENTERVILLE, TN        40-1587      JULY     2005     SEPTEMBER 2005
WAVERLY AIRPORT, TN    40-9493      AUGUST   2005     OCTOBER   2005
LAWRENCEBURG, TN       40-5089      AUGUST   2005     OCTOBER   2005
CARTHAGE, TN           40-1480      SEPTEMBER 2005     NOVEMBER  2005
MONTEREY, TN           40-6170      OCTOBER  2005     DECEMBER  2005
SPRINGFIELD, TN       40-8562      NOVEMBER 2005     JANUARY   2006
ROCK ISLAND, TN        40-7811      DECEMBER 2005     FEBRUARY  2006

THE NEW FPU DATA WILL BE PUBLISHED BY THE NATIONAL CLIMATIC DATA CENTER
(NCDC) IN THE HOURLY PRECIPITATION DATA (HPD) PRODUCT NO EARLIER THAN
THE DATA AVAILABILITY DATE LISTED ABOVE.

INFORMATION ON THE HPD PRODUCT IS AVAILABLE FROM NCDC ON THEIR
WEBSITE:

HTTP://OCCLUDED.NCDC.NOAA.GOV/SERIALPUBLICATIONS/

IF YOU HAVE ANY QUESTIONS CONCERNING THE IMPLEMENTATION OF THE
FISCHER-PORTER UPGRADE AT OLD HICKORY WFO, TENNESSEE PLEASE
CONTACT:

RALPH TROUTMAN
NWS/WFO-OHX, DATA ACQUISITION PROGRAM MANAGER
OLD HICKORY, TN
PHONE: 615-754-4634 EXTENSION 225
EMAIL: RALPH.TROUTMAN@NOAA.GOV

THIS AND OTHER PUBLIC INFORMATION STATEMENTS AREA AVAILABLE ONLINE
AT(USE LOWER CASE LETTERS): HTTP://WWW.NWS.NOAA.GOV/OM/NOTIF.HTM

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NNNN
    
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At this time the NWSREP should review the template PNS and update it for any schedule changes to the planned month and year of future FPU site installations. Inquire with the NWS regional focal point to confirm availability of FPU Kits and delivery schedules to the WFOs.

1.3.4 Monitor and Evaluate Routine Operations

There are 3 operational areas each NWSREP shall monitor. First, is FPU data representative of meteorological conditions? Second, is the data complete based on nominal system operations? Third, can you describe any system component that will require maintenance or a situation that might lead to discrepancies in precipitation measurement or the generation of non-valid precipitation records?

For each FPU system conduct an ongoing monitoring and retrospective evaluation of the first 30-days of system and data performance. Each NWSREP will write a short 300 to 500 word summary to outline the general performance of the FPU system. If precipitation events occurred account for them, including variations in local precipitation amounts, and possible non-representative values attributed to meso-scale phenomena.

1.3.5 Discrepancies: Submit the 30-Day Evaluation Report

If any significant discrepancies were discovered, elaborate them in your '30-Day Evaluation Report' and e-mail your RCPM in a timely manner. If needed, ask the Observer to submit his 'FPU Event Log Worksheet'. When you submit the 30-Day Evaluation Report to RCPM include the recommended resolutions and identify any collateral effects that might have resulted from these discrepancies. The report shall include COOP Station Name, Number, Observer, date of problem within the period of performance, and names of anyone who performed maintenance on the FPU system either at the Observer site, or in your WFO. The final version of the 30-Day Evaluation Report must give a description of how the discrepancy was resolved, or mitigated, who corrected the fault (i.e., factory, warehouse, headquarters, local office, Observer) or discrepancy.

Retain both the checklist and the evaluation report in the WFO for 6 months. Only if there is a significant FPU discrepancy identified in your report, then ensure a copy of your 30-Day Evaluation Report is e-mailed to your RCPM within five working days after completion of the 30-day monitoring period. A measure of significance of a discrepancy is when a problem either cannot be resolved by your WFO, or the problem has regional or national implications.

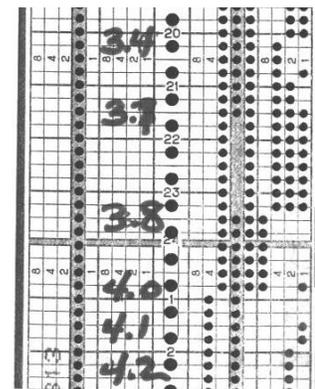
Your RCPM may be required to initiate timely corrective actions, which are beyond the capability of the WFO. The RCPM will analyze the issue identified in your 30-day report and e-mail it to the NWS FPU Implementation Manager, David Mannarano (OPS22), only when problems either cannot be resolved at the Region level or have national implications.

1.3.7 Ensure Continuity of Precipitation Records – Transition Month

In the transition month when F&P operations are discontinued, the NWS risks losing quality controlled data records from the F&P gauge's final days/weeks due to NCDC's inability to quality control both F&P and FPU datasets for the given month. A gap in NCDC's monthly climate publications would result if it were not for a data recovery method.

For this reason NCDC requests field office's help in recovering the punch tape (WS Form B-18) records from the final month of F&P operation.

Obtain the partial-month B-18 and locate the 12AM to 1AM division for the first day of the month. There are four 15-minute records per hour, decode just the one record closest to the top of the hour for each of the 24-hour divisions. Thus, decode every *fourth* 15-minute record. Subtract the 12AM value from the 1AM value and enter it to the '1AM' cell in the Form 791D table. Repeat this process for each hour in the B-18, up to the final full hour's record.



WS Form B-18

The spreadsheet will add each hour's value, down the row, and produce a daily-total amount to the 'total' cell at the end of the row.

Edit the Form 791D with a notation, 'END', into the cell that corresponds to the Date and Hour of the B-18's last full hour of 15-minute data perforations.

Name your Excel spreadsheet file according to the unique COOP SID (79ID_SSXXXX.xls).

For example: 79ID_405956.xls

Then e-mail the file to Stuart.Hinson@noaa.gov, at the NCDC.

NOAA Form 79-ID		U.S Department of Commerce													STATION NUMBER		40-5956										
August 2001		National Oceanographic and Atmospheric Administration													STATION NAME		MemphisWFO										
		Environmental Data and Information Service													MONTH		MAY										
		National Climatic Data Center													YEAR		2005										
HOURLY PRECIPITATION																											
Recorded by a F&P Weighing Rain Gauge																											
Date	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	NOON	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	MID	TOTAL	Date	
1																									0.00	1	
2																										0.00	2
3																										0.00	3
4																										0.00	4
5																										0.00	5
6																										0.00	6
7																										0.00	7
8																										0.00	8
9							0.1					0.1	0.1													0.30	9
10																										0.00	10
11																										0.00	11
12																										0.00	12
13															0.1											0.10	13
14						0.4	0.3																			0.70	14
15										0.1																0.10	15
16																										0.00	16
17																										0.00	17
18																										0.00	18
19																										0.00	19
20																										0.00	20
21																										0.00	21
22																										0.00	22
23																										0.00	23
24																										0.00	24
25																										0.00	25
26																										0.00	26
27																										0.00	27
28																										0.00	28
29																										0.00	29
30																										0.00	30
31																										0.00	31
Date	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	NOON	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	MID	TOTAL	Date	
Amounts in inches, tenths and hundredths for hour ending at observation time; therefore, time distribution of amounts less than one hundredth of an inch are rounded up to the nearest hundredth.																								1.20			
Times are Local Standard Time (LST)																											
* Amounts included in following measurement; time distribution unknown																											
M = No Record																											

Form-791D, below, is an Excel (XLS) formatted file with embedded arithmetic formula.

The NWS Training Center (NWSTC) provides us detailed instructions for completing the WS Form 79-1D, (see, above). Reference the Remote Training Module (RTM), page 630-60, and page A-36.

RTM 630-60

Page A-36

NOAA Form 79-1 D.1 DATA SHEET, HOURLY RECORD

Description: The 79-1D.1 is the form normally used by the NWSREP to extract hourly precipitation data from punch tapes if it is unlikely that data can be successfully extracted by NCDC's translator. The 79-1 provides a convenient format for manually extracting precipitation data and recording it for processing at NCDC.

Completion:	Fill in the heading of the form as follows, for:
Station Number:	Give same COOP Index Number as on B-44.
Station Name:	Give same COOP Station Name as on B-44.
Month:	Give the month the precipitation was measured.
Year:	Give the year the precipitation was measured.

For partial month data extractions from tape/chart:

Enter "PARTIAL MONTH" on line below HOURLY PRECIPITATION.

Enter BEGINS: Date/Time in Date row before 1st hourly data entry.

Enter ENDS: Date/Time in Date row after last hourly data entry.

For full month data extraction from tape/chart:

Enter "FULL MONTH" on line below HOURLY PRECIPITATION.

Note that DAYS (1-31) are listed vertically while hours (AM & PM) are listed horizontally across the top of the form. Calculate the differences in punch holes on the punch tape for every consecutive hourly punch (Every 4th punch). Enter this difference in tenths (e.g., 0.3) in the appropriate time block corresponding to the hourly precipitation indicated on the punch tape.

Note: Entry instructions on bottom of form ask for amounts in inches and hundredths. Since punch tape gage only records data to the nearest tenth, extracted data are to be entered on form in tenths, only.

1.3.8 Open a Station Inspection Report in CSSA

Follow the procedures as described in Appendix E of the National Weather Service Manual, 10-1313, dated March 18, 2005, *Cooperative Station Service Accountability (CSSA) User Manual*. It is accessible on webpage: <http://www.nws.noaa.gov/directives/010/pd01013013a.pdf>.

Station visits, including the installation of FPU mounting pole (i.e., 3 inch diameter pipe), and the installation of the data logger and solar panel, shall be logged into the CSSA Station Inspection Report. Each visit to the COOP site shall be documented this way by the 10th day of the month following the visit.

Complete all the prompted fields in the Report Screen (see graphic below).

**COOPERATIVE STATION SERVICE ACCOUNTABILITY (CSSA)
SITE INSPECTION REPORT**

Station Name: **LIVINGSTON RADIO WLIV** Station Number: **40-5332** Climate Division: **02**

INSPECTION DATA

Inspector: NETWORK PROGRAM MANAGER
 Inspection Type: ANNUAL
 Inspection Date: 05/06/2005
 Staff Hours: 6
 Miles Driven: 183
 Per Diam: N
 Trip Number:
 Supplies Cost:
 Trip Cost:

EQUIPMENT	Maintenance Performed - More than one may be chosen				
SRG	<input type="checkbox"/> Not Serviced	<input type="checkbox"/> Painted	<input type="checkbox"/> Modified	<input type="checkbox"/> Replaced	<input type="checkbox"/> Moved/Relocated
	<input checked="" type="checkbox"/> Routine Maintenance	<input type="checkbox"/> Calibrated	<input type="checkbox"/> Repaired	<input type="checkbox"/> Installed	<input type="checkbox"/> Removed
MMTS-1	<input type="checkbox"/> Not Serviced	<input type="checkbox"/> Painted	<input type="checkbox"/> Modified	<input type="checkbox"/> Replaced	<input type="checkbox"/> Moved/Relocated
	<input checked="" type="checkbox"/> Routine Maintenance	<input type="checkbox"/> Calibrated	<input type="checkbox"/> Repaired	<input type="checkbox"/> Installed	<input type="checkbox"/> Removed
F&P	<input type="checkbox"/> Not Serviced	<input type="checkbox"/> Painted	<input type="checkbox"/> Modified	<input checked="" type="checkbox"/> Replaced	<input type="checkbox"/> Moved/Relocated
	<input type="checkbox"/> Routine Maintenance	<input type="checkbox"/> Calibrated	<input type="checkbox"/> Repaired	<input type="checkbox"/> Installed	<input type="checkbox"/> Removed

211 characters left

REPLACED F&P WITH FPU. 2.5 HOURS ON SITE.

Remarks

Save Inspection Report Clear Changes Delete Inspection Quit Form(don't save)

For Inspection Type, enter “Annual”

For Equipment, Maintenance Performed, go to the third line, F&P, and enter: “Replaced”.

In the Remarks window (i.e., free text box), enter “Replaced F&P with FPU.” and the time you spent on site, e.g., “2.5 hours on site.”

1.3.9 Submit WS Form B-44 to NCDC

Update the CSSA Station Report (e.g., WS Form B-44) for each COOP Station that has completed its modification from F&P Model 3, Modification 6, to Fischer-Porter Upgrade (FPU) Data Key. Use the terms of reference contained in the document National Weather Service Manual, 10-1313, dated March 18, 2005, Cooperative Station Service Accountability (CSSA) User Manual. It is accessible on webpage:

<http://www.nws.noaa.gov/directives/010/pd01013013a.pdf>

Update the **Remarks**: section to explain: “Updated equipment, replaced F&P with Fischer Porter Upgrade (FPU) electronic load sensor.”

Update the **Observed Element**: section in the appropriate panel with the large block letters “HOURLY PRECIPITATION REPORT”. In the first row, with EQUIPMENT, enter the following:

Equipment Code: FPU
 Serial Number: 0ccc (4-digit GMA data logger’s serial number, located several inches in front of the Data Key receptacle inside the stainless steel enclosure)
 Owner: NWS
 Telemetry: N
 Equipment Description: CALIBRATION: A=0, B= NNNN.nnnn, C= - N.nnnn”
 Azimuth: (do not change, unless you have moved the gauge’s catch bucket)
 Distance: (do not change, unless you have moved the gauge’s catch bucket)

In the second row, with ‘REPORTING / PAY’ enter the following:

Ob Time: MID
 Rept Method: ADP
 Recipient: WFO-SID / NCDC
 Sponsor: FC-1 (default, unless otherwise sponsored)
 Paid: N (unless paid)
 Data Ingest Via: DATA KEY
 Special Network: (leave blank)
 Mode: (leave blank)
 Relay: (leave blank)
 When?: (leave blank)

From the time you submit your change request for NCDC approval to the time the CSSA data base is updated will take approximately 15 calendar days. If you have any questions on the CSSA Workflow Process, e-mail or phone your RCPM.

COOPERATIVE STATION SERVICE ACCOUNTABILITY									
STATION REPORT(B-44 Long)									
Observation Info									
Station Name: OLD HICKORY WFO			Station Number: 40-6806 Climate Division: 03 Rendition: 13						
Observed Element: HOURLY PRECIPITATION REPORT									
EQUIPMENT									
Equip	Serial Number	Owner	Exp	Tel	Equipment Description	Azimuth	Distance	Backup?	
FPU	0018	NWS		N	CALIBRATION: A=0, B=1286.0523, C=-4.1076	090	8	N	
REPORTING/PAY									
Ob Time	Rept Method	Recipient	Sponsor	Paid	Data Ingest Via	Special Network	Mode	Relay	When?
MID	ADP	PHX,NCDC	FC-1	N	DATA KEY				MONTHLY

https://ops13web.nws.noaa.gov - CSSA Observation Info - Microsoft Internet Explorer

*Items in Red indicate required fields

COOPERATIVE STATION SERVICE ACCOUNTABILITY (CSSA)

STN INFO	OBSERVER DATA	OB INFO	OTHER EQUIP INFO	OBSTRUCTIONS	PUBLICATION DATA
----------	---------------	---------	------------------	--------------	------------------

Station Name: **OLD HICKORY WFO** Station Number: **40-6806** Climate Division: **03** Rendition: **13** Other Obs

Observed Element: HOURLY PRECIPITATION REPORT

EQUIPMENT

Equipment Code	Serial Number	Owner	Exp	Tol	Equipment Description	Azimuth	Distance
FPU	0018	NWS		N	CALIBRATION: A=0, B=1286.0523, C=-4.10;	090	8

REPORTING/PAY

Ob Time	Rept Method	Recipient	Sponsor	Paid	Data Ingest Via	Special Network	Mode	Relay	When?
MID	ADP	OHX,NCDC	FC-1	N	DATA KEY				MONTHLY

**** To delete an observation detail record, set the Ob Time to 'DEL!'.**

 3 of 3

CSSA Station Info

COOPERATIVE STATION SERVICE ACCOUNTABILITY (CSSA)

STN INFO	OBSERVER DATA	OB INFO	OTHER EQUIP INFO	OBSTRUCTIONS	PUBLICATION DATA
----------	---------------	---------	------------------	--------------	------------------

Station Name: **OLD HICKORY WFO** Station Number: **40-6806** Climate Division: **03** Rendition: **12**

<p>STATION LOCATION Station ID: NSHT1</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Latitude</th> <th>Longitude</th> <th>Horiz Ref Datum</th> <th>Vert Ref Datum</th> </tr> <tr> <td>36.2469 (36.14.49N)</td> <td>-86.5631 (86.33.47W)</td> <td>NAD83</td> <td>NAGVD29</td> </tr> </table> <p>Lat/Lon Source: GPS - GARMIN MODEL III CPA Rgn: SR</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>County</th> <th>State</th> <th>Elevation</th> </tr> <tr> <td>WILSON</td> <td>TN</td> <td>590</td> </tr> </table>	Latitude	Longitude	Horiz Ref Datum	Vert Ref Datum	36.2469 (36.14.49N)	-86.5631 (86.33.47W)	NAD83	NAGVD29	County	State	Elevation	WILSON	TN	590	<p>STATION DETAIL</p> <p>Zero Datum (River Sites) Time Zone: CENTRAL</p> <p>Station Type: WEATHER FORECAST OFFICE (WFO) - 40</p> <p>COOP Network: COOP STATION HYDRO (B)</p>
Latitude	Longitude	Horiz Ref Datum	Vert Ref Datum												
36.2469 (36.14.49N)	-86.5631 (86.33.47W)	NAD83	NAGVD29												
County	State	Elevation													
WILSON	TN	590													

<p>STATION MGMT</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>CPA</th> <th>CWA</th> <th>HSA</th> </tr> <tr> <td>OHX</td> <td>OHX</td> <td>OHX</td> </tr> </table> <p>ET: TIR (OHRFC) RFC: TIR (OHRFC)</p>	CPA	CWA	HSA	OHX	OHX	OHX	<p>STATION ADMIN</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Authorizing Doc</th> <th>Authorization Date</th> <th>Station Begin Date</th> <th>Primary Auth</th> <th>Secondary Auth</th> </tr> <tr> <td>WFS41</td> <td>04/23/1974</td> <td>06/01/1974</td> <td>DAPM/OHX</td> <td>SH/OHX</td> </tr> </table> <p>Reason for Report (see Remarks): 10 CHANGE Effective Date: 05/03/2005 NWSREP: OHX</p>	Authorizing Doc	Authorization Date	Station Begin Date	Primary Auth	Secondary Auth	WFS41	04/23/1974	06/01/1974	DAPM/OHX	SH/OHX
CPA	CWA	HSA															
OHX	OHX	OHX															
Authorizing Doc	Authorization Date	Station Begin Date	Primary Auth	Secondary Auth													
WFS41	04/23/1974	06/01/1974	DAPM/OHX	SH/OHX													

Topography
 ROLLING HILLS WITH OLD HICKORY RESERVOIR 1/2 MI W.
Driving Directions
 FROM I-40 TAKE OLD HICKORY BLVD N TO 2ND LIGHT, TURN R ON TO ANDREW JACKSON (BECOMES SAUNDERSVILLE RD) AND GO 5.7 MI. TURN R ON NEEDMORE AND THEN L INTO PARK. RADOME VISIBLE FROM TOP OF HILL.
Remarks
 UPDATE EQUIPMENT, CHANGE F&P TO FPU. F&P WILL REMAIN FOR DATA CONTINUITY STUDY. SPOKE WITH MS WARNICK/IMC 5/12/2005.

1.4. POST-IMPLEMENTATION ACTIONS:

1.4.1 Post-Implementation Packet to RCPM:

By the fourth week after your first COOP station has completed its phase-over to FPU operations, review the Operational Implementation Plan (IOP), Checklist B, to see if there were any items outstanding or missing, or in some way needed follow-up with the Cooperative Observer. Compile, correct, re-address any Observer submitted documentation for one last WFO Packet to be mailed the RCPM.

Six weeks after phase-over of each FPU Station, mail your RCPM a copy of the following:

- a. NWSREP-signed *Operational Implementation Checklist B* that vouches for the proper installation, calibration, and initial operation of the FPU.
- b. Print copy of the NCDC inventory of ingested HPD files confirmation receipts: http://www1.ncdc.noaa.gov/pub/data/hpd/oresites/inv/HPD_Received.txt
- c. If any one of the FPU systems experienced a significant discrepancy as defined in Section 1.3.5, above, then e-mail your '*30-Day Evaluation Report*', to your RCPM. Also e-mail or FAX your RCPM the following two items:
- d. *FPU Event Log Worksheet*, to account for install date, calibration data, and power on date.
- e. *FPU Trouble Report*, if Observer reported no anomalies, then write down, 'None'.

1.4.2 Operational Quality Control

Beyond the initial 30-day evaluation period, continue to monitor the FPU system performance through visual inspection of the CSV data files when you upload each station's monthly reporting key. Also, be vigilant and periodically visit the NCDC inventory webpage, and inquire into the size of each of your FPU station's monthly CSV file (i.e., after NCDC unzips them). Follow the guidelines in Section 2.2.6, of this FPU Operations Manual, "Examine CSV to Confirm Collection Month is Present", if you suspect a meteorological condition has resulted in ambiguous or discrepant precipitation data.

1.4.3 Dispose of Old Equipment

No equipment is to be returned to the National Reconditioning Center (NRC) or the National Logistics Supply Center (NLSC). Rather, the WFO may choose to retain used, undamaged F&P equipment at the WFO. Otherwise, follow policy in Appendix H, of the *FPU Assembly Instructions*, the WFO may dispose of any used F&P 'old equipment' only after the NWS headquarters and your RCPM has stated the FPU Operational Implementation (OI) has officially concluded.

1.4.4 FPU Network Distribution about the NWS:

NWS Regions	WFO	COOP Stations Implementing FPU	Post-Implementation Packet sent to RCPM?
Eastern Region	13	40	
Southern Region	5	90	
Central Region	10	80	
Western Region	7	40	
Alaska Region	0	0	
Pacific Region	0	0	
Totals	35 WFO	250 Stations	
NWS Regions	WFO	COOP Stations Implementing FPU	Post-Implementation Packet sent to RCPM?
Eastern Region (13)	Buffalo	5	
	Gray-Portland	5	
	Albany	4	
	Burlington	4	
	Cleveland	3	
	Balt-WashDC	3	
	Morehead Cty	3	
	Roanoke	3	
	Wakefield	2	
	Binghamton	2	
	Raleigh	2	
	Charleston-WV	2	
	Mt.Holly/Phila	2	
Southern Region (5)	Shreveport	28	
	Memphis	24	
	San Juan	21	
	Nashville	12	
	Knoxville	5	
Central Region (10)	Rapid City	18	
	Kansas City	13	
	Springfield-MO	11	
	Dodge City	7	
	Aberdeen-SD	7	
	Grand Forks	6	
	Northern IN	5	
	N.Ctrl Lower MI	5	
	Indianapolis	5	

	Marquette	5	
Western Region (7)	San Fran. Bay Area	11	
	Flagstaff	11	
	Pendleton	7	
	Glasgow	5	
	Los Angeles	3	
	Seattle	2	
	Portland-OR	1	
Alaska Region (0)	- None -	- None -	
Pacific Region (0)	- None -	- None -	
Totals	35 WFO	250 Stations	

Maps of Fischer-Porter/Belfort network sites (CONUS) are updated monthly by NWS Headquarters to show the location of the planned 250 FPU sites and also show their implementation status. See them on: <http://www.nws.noaa.gov/ops2/Surface/coopmaps.htm>

APPENDIX B – DATA LOGGER NOTATION CODES

Use the numeric keypad in the enclosure to enter 3-digit codes to account for the checks and maintenance activities you perform on the FPU.

Notations made by **Observer** range from **100 to 140**.

Notations made by **NWSREP** range from **150 to 255**.

Code	Meaning of Observer Maintenance Code
100	End of Valid data
103	Time is more than 15 minutes fast/slow
104	Routine Gauge Check
115	Emptied Bucket – Bucket completely emptied
116	Partially Emptied Bucket – Some liquid left in bucket
117	Added Oil to Bucket
118	Added Antifreeze to Bucket
125	Installed Funnel
126	Removed Funnel
140	Start of Valid Data

NWSREP Maintenance

Code	Meaning of NWSREP Maintenance Code
150	End of Valid Data – NWSREP Visit
151	Annual Visit
152	Semi-Annual Visit

153	Liaison Visit
154	Emergency Visit
156	Data from GMA copied to data key
160	Emptied bucket
161	Emptied and cleaned bucket
162	Partially drained bucket – some liquid remains in bucket
163	Added Oil to bucket
164	Added Antifreeze to bucket
166	Installed new bucket to replace damaged bucket
170	Installed Funnel
171	Removed Funnel
180	Cleaned F&P Case
181	Cleaned Solar Panel
182	Cleaned MMTS sensor
183	Cleaned GMA
190	Replaced all Flexures
191	Replaced Top Front Flexures
192	Replaced Top Rear Flexures
193	Replaced Bottom Front Flexures
194	Replaced Bottom Rear Flexures
201	Replaced MMTS sensor

210	Replaced GMA – A completely new GMA was installed
211	Replaced GMA battery
213	Replaced Load Cell in FPU
220	Calibration Check – No changes to previous values
221	Calibration Check – New values were entered
230	Gauge moved to a compatible location – equipment move
231	Gauge moved to a non-compatible location – station relocation
232	Gauge removed from service – placed in storage
233	Gauge put back in service after being in storage
255	Start of Valid Data – NWSREP Visit

End of ‘Appendix B: Data Logger Notation Codes.’